A NEW SUBSPECIES OF *CIRSIUM PARRYI* (ASTERACEAE: CARDUEAE) FROM ARIZONA AND COMMENTS ON THE *CIRSIUM PARRYI* COMPLEX

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ABSTRACT

Cirsium parryi subsp. *mogollonicum* is applied to a local variant of *Cirsium parryi* discovered on the Mogollon Escarpment, Arizona. The white fresh corollas and nearly entire basal and cauline leaves of this understory, canyon dwelling subspecies distinguish it from the other members of the *C. parryi* complex that includes the Wooton and Standley segregates, *C. gilense, C. inornatum,* and *C. pallidum,* of wet meadows/parklands. Mature leaves of *C. parryi* subsp. *parryi* and the Wooton and Standley segretates are sinuately toothed to sinuately lobed and corollas are described as yellow-ochroleucous. Type material of *Cirsium gilense* and *C. inornatum* appears to differ little from variation noted in *C. parryi* subsp. *parryi* and perhaps should again be submerged within *C. parryi.* The relatively long, linear, densely pubescent tips of the outer and middle phyllaries noted on the holotype of *Cirsium pallidum* serve to distinguish this taxon from others in the complex.

During a field trip on 7 July 1987 to survey riparian vegetation along the perennial streams on the Mogollon Rim that ultimately drain northward to the Little Colorado River, we discovered an unusual *Cirsium* in late bud within the cool, shaded confines of the canyon cut by Dane Spring. Later in the season this thistle was located in the streamside understory of Dane Canyon just upstream from the confluence of Dane and Dane Spring Canyons. Three riparian vegetation inventories have been completed in canyons adjacent to Dane and Dane Spring Canyons since 1987 and this *Cirsium* is still known only from the original sites of discovery.

The white fresh corollas and nearly continuous, spinulose-ciliate margins of the basal and cauline leaves of this *Cirsium* did not immediately suggest any known Arizona species (Kearney and Peebles 1960). Because the corollas dried a very light yellow, we borrowed material of the yellow flowered *Cirsium parryi* (A. Gray) Petrak (Petrak 1911) from ARIZ. Observed similarities in phyllary morphology established between these specimens and the Dane Spring Canyon thistle prompted us to borrow type specimens of the basionym of *Cirsium parryi, Cnicus parryi* A. Gray (Gray 1874), [GH,

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ISC, NY, and US] and a sampling of specimens [MIN] from throughout the range of *C. parryi* (Harrington 1954; Martin and Hutchins 1980; Kearney and Peebles 1960) as well as type material of the yellow flowered thistles once included within *C. parryi* (Wooton and Standley 1913): *C. gilense* Wooton and Standl., *C. inornatum* Wooton and Standl., and *C. pallidum* Wooton and Standl. (US).

Phyllary and corolla morphology observed in our thistle closely resembles that found in *C. parryi* subsp. *parryi, C. gilense,* and *C. inornatum.* Phyllaries with dilated, scarious-coriaceous, lacerate-fimbriate tips, common to all others in the *C. parryi* complex, are missing in *Cirsium pallidum.* Tips of the outer phyllaries on the holotype of *C. pallidum* are long, nearly linear, and densely pubescent, primarily at the margins, with coarse moniliform hairs (Wooton and Standley 1913). Both tip length and pubescence decrease as the innermost whorl of phyllaries is approached. The innermost whorl of bracts is similar morphologically to those found elsewhere in the *C. parryi* complex. *Cirsium gilense* and *C. inornatum* were segregated from *C. parryi* (Wooton and Standley 1913) based on characters that vary greatly throughout the *C. parryi* complex: head size, head number per branch, number of foliaceous bracts below the head, leaf thickness, and leaf spininess. On annotations applied to specimens in 1967, R. J. Moore commented on the poorly defined nature of *C. gilense, C. inornatum,* and *C. pallidum,* "New Mexico plants related to *C. parryi* are said to be either *C. pallidum, C. gilense* or *C. inornatum.* The distinction is difficult." Except as indicated for *C. pallidum* above, we agree with Moore and suggest that variation included within *C. gilense* and *C. inornatum* could be comfortably housed within *C. parryi* subsp. *parryi.* No new status is offered, or suggested, for *C. pallidum.*

Phyllary and corolla morphology of the Dane Spring and Dane Canyon *Cirsium* indicate that it has had its origin from within the *C. parryi* complex. On the other hand, the white fresh corollas and nearly continuous basal and cauline leaf margins of our thistle contrast strongly with the yellow-ochroleucous corollas and sinuate-dentate to sinuately lobed leaves reported for the rest of the complex. Spines of this thistle are poorly developed and similar, in stoutness and size (normally 2 mm or less in length), to those found on very immature (juvenile) leaves of *C. parryi.* Unlike other members of the complex that are adapted to wet mountain meadows and parkland, the Dane Spring and Dane Canyon *Cirsium* is restricted to the low light intensities of the canyon understory. We believe that the thistle we discovered represents variation unique within *C. parryi* and we here propose a new subspecies.

Cirsium parryi subsp. **mogollonicum** C. Schaack & G. Goodwin subsp. nov. (Fig. 1)—TYPE: USA, Arizona, Coconino Co., Mogollon

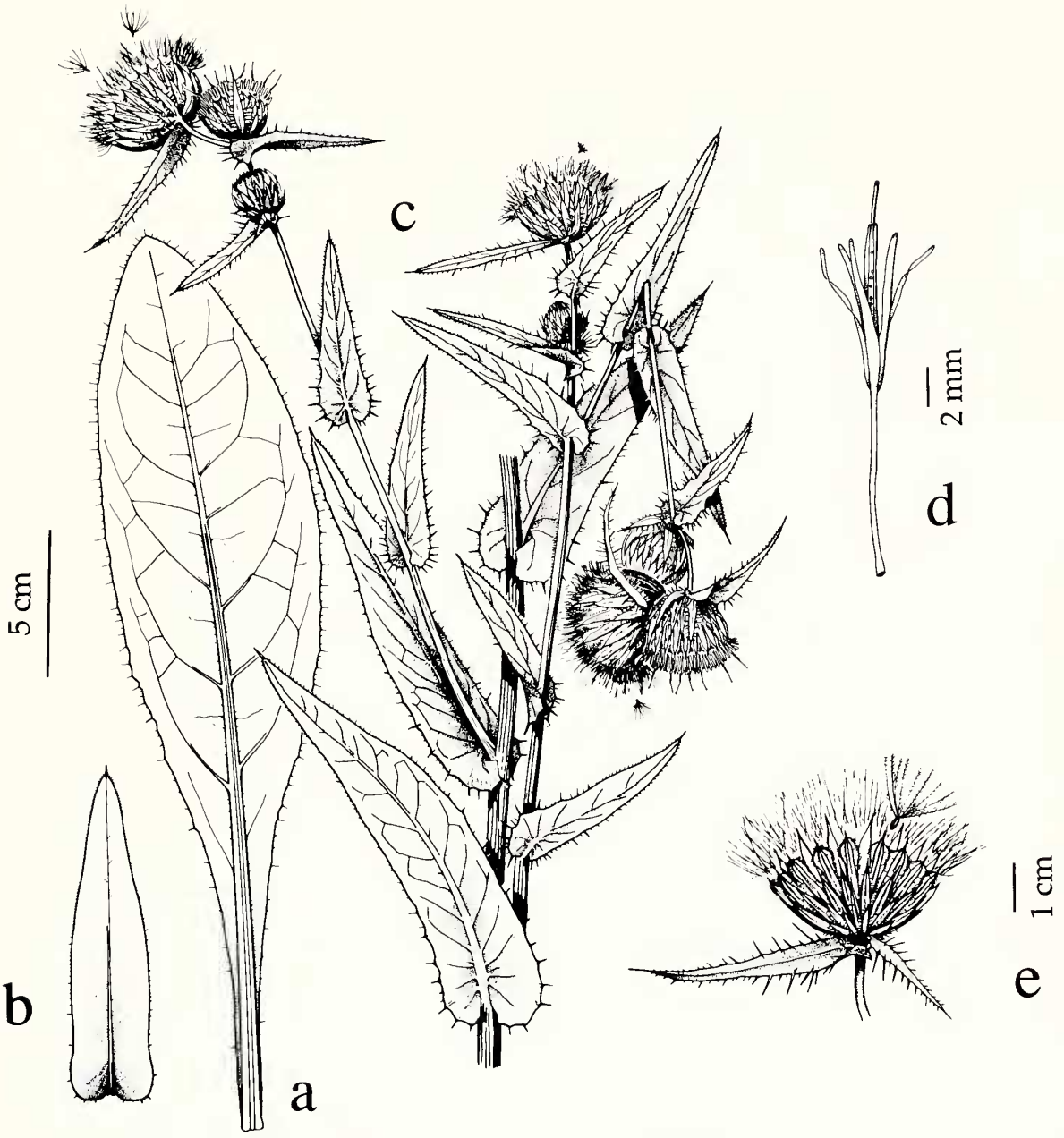

FIG. 1. *Cirsium parryi* (A. Gray) Petrak subsp. *mogollonicum* Schaack and Goodwin (drawn from the holotype and isotype *Schaack et al. 2175* and paratype *Schaack et al. 2241*). a, Basal leaf; b, lower cauline leaf; c, head-bearing branches; d, corolla; e, head.

Rim, riparian habitat, shaded confines of Dane Spring Canyon, T13N R11E sect. 35, ca. 2195 m (7200 ft), 27 Aug 1987, *Schaack et al. 2175* (holotype, WIS; isotype, ARIZ).

Corolli dulces albi et margines foliorum basalium et caulinorum principalium paene continui, tantum interrupti spinis minutis 2 mm longis vel brevioribus distinguunt subsp. *mogollonicum* a subsp. *parryi* corollis ochroleucis vel flavis et marginibus foliorum sinuate dentatis vel lobatis spinis plerumque longiorubus quam 2 mm.

Taprooted biennial (short-lived perennial?), 0.55–1.52(–2.0) m tall. Stems normally branched only at or near the apex, basally

hollow and succulent, ribbed, thinly-densely arachnose below the heads, otherwise villous-glabrous; nodes of the unbranched stem 3.0–7.5 cm apart. Rosette leaves broadly spatulate, sparingly pilose and darker green above, glabrate and lighter green below, margins spinulose ciliate, otherwise continuous. Cauline leaves alternate, the first few oblanceolate-spatulate, the remainder lanceolate-broadly lanceolate, sessile and clasping with more or less rounded auricles, not decurrent, short and weakly spine-tipped apically (ca. 2 mm), darker green and thinly pubescent above, glabrate and lighter green beneath; margins of leaves positioned below those subtending the head bearing branches spinuliferous-spinulose ciliate (spines ca. 2 mm or < in length) otherwise undissected, margins of leaves and bract-like leaves on or subtending the head-bearing branches also nearly continuous but more heavily armed. Heads solitary, or few (2–4), borne at the stem apex or on branches that arise from the upper leaf axils, subtended by spiny, bract-like leaves that grade from bracts large enough to overtop the heads to those that are similar in size and shape to the phyllaries. Involucres at anthesis thinly arachnose, 1.6–2.0 cm high, 2.0–2.7 cm across; phyllaries loosely imbricate, in few series, without a dorsal glutinous ridge; outer phyllaries lanceolate, spine-tipped, scabrellate dorsally and at margins for ⅓–½ of their length, otherwise chartaceous fimbriate, some spinulose ciliate at the base; middle phyllaries more or less lanceolate, weakly spine-tipped with a dilated apex, scabrellate dorsally and at the margins for most of their length, margins of the dilated tip scarious-chartaceous, lacerate-fimbriate; innermost phyllaries narrowly lanceolate, weakly spine-tipped to short aristate, ciliate-fimbriate to nearly entire at the narrowed apex, scabrellate dorsally and at the margins below. Corollas white when fresh, drying a very light yellow, 10–14 mm long; the tube 8.0–10.0 mm long; the throat 2.0–4.0 mm long, (0.7–)1.0–1.5(–1.75) mm wide; lobes nearly equal, linear-lanceolate, 4.0–6.0 mm long; pappus plumose, dusky white-light brown in dried specimens. Achenes flat, light brown and black streaked to nearly black, 5.0–5.1 mm long, 1.9–2.25 mm wide; fruiting pappus 12–13 mm long.

Paratypes. USA, Arizona, Coconino Co., Mogollon Rim, Dane Canyon in the understory just upstream from the confluence of Dane and Dane Spring Canyons, T13N R11E sect. 35, ca. 7200 ft (2195 m) 27 Aug 1987, *P. Boucher 662* (ASC); 12 Sep 1987 *C. Schaack et al. 2241* (ASU); 100 yards south of the junction of Dane Spring Canyon and Dane [in Dane Canyon], grassy area below Douglas-fir, 30 Sept 1989, *William Knight s.n.* (ASU, OBI).

Key to the *Cirsium parryi* Complex

A. Phyllary tips of outer and middle bracts nearly linear, without dilated tips; densely pubescent, primarily at the margins, with coarse moniliform hairs .... *C. pallidum*

A′ Phyllaries between the outermost and innermost bract series with dilated, scarious-chartaceous, lacerate-fimbriate tips; tips lacking coarse moniliform hairs .... B
B. Corollas yellow-ochroleucous; mature cauline and/or basal leaves sinuately toothed-sinuately lobed and armed at the margins with spines normally >2 mm long; plants of moist or wet ground in mountain meadows and parkland, Arizona, Colorado, New Mexico, and Utah (Welsh et al. 1987). ..... *C. parryi* subsp. *parryi*
B′ Fresh corollas white; margins of mature leaves beset with spines ca. 2 mm long or < [spinulose ciliate] otherwise continuous; plants of moist to very moist soils in the riparian understory of Dane Spring and Dane Canyons, Mogollon Escarpment, Arizona ..... *C. parryi* subsp. *mogollonicum*

Distribution, habitat and *phenology. Cirsium parryi* subsp. *mogollonicum* is a rare thistle (ca. 40 individuals) and is restricted in Arizona to less than one square mile of equally rare habitat: associated with perennial streams above 7000 feet (2134 m). Though a small portion of the Dane Spring and Dane Canyon *Cirsium* population occurs under somewhat open coniferous canopy [*Pinus ponderosa* Dougl., *Pseudotsuga menziesii* (Mirbel) Franco and *Abies concolor* (Gordon & Glendinning) Lindl.], it occurs more typically under nearly closed canopy and/or within narrow canyon confines where direct sunlight is limited, or nearly excluded, for much of the day. In the latter situation, associates include: *Aquilegia triternata* Payson, *Aralia racemosa* L., *Athyrium filix-femina* (L.) Roth, *Dryopteris filix-mas* (L.) Schott, *Sambucus microbotrys* Rydb. and *Sorbus dumosa* E. Greene. Anthesis of this *Cirsium* begins in July and continues into September. We observed individuals of *Bombus* working the flowers in August. This poorly armed thistle is subject to browsing, apparently by elk. Though evidence of browsing was not noticed in our 1987 collections, the 1989 collections of *C. parryi* subsp. *mogollonicum* by Knight showed signs of this activity. Normally only the first few nodes of this thistle, when uncropped, bear spatulate-oblanceolate leaves. Leaves above these nodes are normally lanceolate. New growth from the cropped paratypes of Knight differed from this pattern and held many more spatulate-oblanceolate leaves than uncropped plants.

The *Cirsium* we report is not the only unusual find in the riparian habitat of the canyons flowing northward to the Little Colorado. To further emphasize the singular nature of these environs, Dane Canyon, upstream from the *Cirsium* site, houses the second, and perhaps now the only, known Arizona location for the circumboreal fern species *Gymnocarpium dryopteris* (L.) Newm. (Boucher 1988). Additionally, the canyon sides above the site of the type collection of *C. parryi* ssp. *mogollonicum* support a small population of *Vaccinium myrtillus* L., previously known only from higher elevations in the White Mountains of eastern Arizona (Kearney and Peebles 1960) and the San Francisco Mountain near Flagstaff (ASC). Orchids, *Platanthera limosa* Lindl. and *Listera convallarioides* (Sw.) Nutt., re-

ported only from the mountains of southern Arizona (Kearney and Peebles 1960) occur just downstream in Dane Spring Canyon from the *Cirsium* and *Vaccinium* locality. Arizona's largest population of *Polystichum lonchitis* (L.) Roth (Michael Windham pers. comm.) also occurs in Dane Spring Canyon. Additional discoveries will be included in a riparian flora of these canyons, in preparation, by Goodwin et al. At this writing, this endemic subspecies and the unique Arizona habitat in which it grows are not endangered. Clearly, careful consideration should be given to protecting high altitude perennial stream habitat within Arizona, a rare and valuable natural resource.

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